

**AMENDMENTS TO THE CLAIMS**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1. (previously presented) A method for use in controlling processing of a structure, the method comprising:
  - providing first measured data including at least one of the following parameters: a thickness of at least one layer of the structure in at least selected sites of the structure prior to said processing of the structure, and a surface profile of the structure prior to said processing;
  - applying spectral optical measurement to at least said selected sites in the structure after said processing and generating second measured data indicative of a spectral response of at least said selected sites of the processed structure;
  - analyzing the second measured data using the first measured data, and outputting data comprising a thickness of at least one layer of the processed structure, said output data being indicative of the quality of said processing.
2. (previously presented) The method of Claim 1, wherein said first measured data is provided by applying measurement to the structure prior to said processing.
3. (original) The method of Claim 1, wherein said first measured data is reference data obtained while controlling a previous processing of said structure.

4. (original) The method of Claim 1, for use in controlling the process of material removal from the structure.
5. (original) The method of Claim 4, wherein said first measured data is indicative of the thickness of an uppermost layer and the thickness of a layer underneath said uppermost layer of said structure, prior to applying the material removal process to said structure.
6. (original) The method of Claim 5, wherein said process to be controlled is aimed at removing the uppermost layer and partially removing the underneath layer.
7. (previously presented) The method of Claim 5, wherein said output data includes a thickness of said underneath layer of the structure.
8. (previously presented) The method of Claim 5, wherein said output data includes a thickness of said underneath layer and a thickness of said uppermost layer of the structure.
9. (previously presented) The method of Claim 5, wherein said first measured data is provided by applying measurement to the structure after the uppermost layer deposition process.

10. (original) The method of Claim 1, for use in controlling the process of depositing an upper thin layer onto a lower thin layer of the structure, wherein the upper and lower layers materials are of the kind capable of diffusing one into the other within an interface region between the layers.

11. (previously presented) The method of Claim 10, wherein said first measured data is indicative of the thickness of said lower layer, and said comprises a thickness of the upper layer.

12. (previously presented) The method of Claim 1, for use in controlling the process of depositing an upper layer onto a patterned surface of a lower layer, the first measured data being indicative of the surface profile of the patterned lower layer , said output data comprising a thickness of the deposited layer.

13. (withdrawn) A method for use in controlling processing of a structure, the method comprising:

- providing first optical spectral measured data indicative of at least one of the following: a thickness of at least one layer of the structure in at least selected sites of the structure prior to said processing of the structure, and a surface profile of the structure prior to said processing;

- applying spectral optical measurements to at least said selected sites in the structure after said processing and generating second optical spectral measured data indicative of at least one of the following: a thickness of the processed structure and a surface profile of the processed structure;

- analyzing the second measured data by interpreting it using the first measured data to thereby determine a thickness of at least one layer of the processed structure, said determined thickness being indicative of the quality of said processing.

14. (withdrawn) A method for use in controlling a material removal process applied to a multi-layer structure, the method comprising:

- providing first optical spectral measured data indicative of a thickness of an uppermost layer of the structure and a thickness of a layer underneath said uppermost layer in at least selected sites of the structure prior to said processing of the structure;

- applying optical spectral measurements to at least said selected sites of the structure after said material removal processing of the structure, and generating second spectral measured data indicative of a thickness of the processed structure;

- analyzing the second measured data by interpreting it using the first measured data to thereby determine at least a thickness of said underneath layer in the processed structure, said determined thickness being indicative of the quality of said processing.

15. (withdrawn) A method for use in controlling a layer deposition process applied to a structure, the method comprising:

- providing first optical spectral measured data indicative of a thickness of a first layer of said structure onto which a second layer is to be deposited;

- applying optical spectral measurements to at least selected sites in the structure after said layer deposition processing of the structure, and generating second measured data indicative of a thickness of the processed structure;

- analyzing the second measured data by interpreting it using the first measured data to thereby determine a thickness of the deposited layer.

16. (withdrawn) A method for use in controlling a layer deposition process applied to a patterned layer of a structure, the method comprising:

- providing first optical spectral measured data indicative of a surface profile of said patterned layer of the structure onto which a second layer is to be deposited;

- applying optical spectral measurements to at least selected sites in the structure after said layer deposition processing of the structure, and generating second measured data indicative of a surface profile of the processed structure;

- analyzing the second measured data by interpreting it using the first measured data to thereby determine a thickness of the deposited layer.

17. (currently amended) An optical system for use in controlling processing of a multi-layer structure, the system comprising:

- an optical device comprising a light source arrangement, a light detector assembly, and a light directing assembly, the optical device being operable to apply optical measurement to the structure and generate measured data representative of light returned from the structure, said generated measured data being indicative of at least one of the following: a thickness of at least one layer of the structure, and a surface profile of the structure;

- a control unit ~~connectable to the optical device~~ and configured to operate said device to apply the optical measurement to the structure before and after said processing, and to receive data generated by the optical device, said control unit having a memory utility for storing first measured data generated by the optical device when applied to the structure prior to said processing, said analyzing of the second measured data including interpreting the second measured data using the first measured data and outputting data comprising a thickness of at least one layer of the processed structure, said output data being indicative of the quality of said processing.